

WHAT IS CLAIMED IS:

1. Rotary cutting tool comprising a shank and a cutting part disposed at a front end of the shank and defining an axis of rotation; an outer periphery of the cutting part therein cutting grooves extending helically to a front end face of the cutting part; the end face including end-face cutting edges formed by an intersection of the end face with respective walls of the grooves; wherein a portion of each cutting groove disposed rearwardly of the end face defining a helix angle with a plane containing the axis, the helix angle being larger than a cutting-face angle formed between the end face and a front end section of each cutting groove; the cutting-face angle continuously transforming into the helix angle.

2. The rotary cutting tool according to claim 1 wherein the cutting-face angle transforms into the helix angle along a constant radius of curvature.

3. The rotary cutting tool according to claim 1 wherein the cutting-face angle transforms into the helix angle along a plurality of radii, including a first radius adjoining the cutting edge, and a second radius adjoining the helix angle, the first radius being smaller than the second radius.

4. The rotary cutting tool according to claim 3 wherein the cutting-face angle has a negative value, and each groove forming a zero-degree angle and then a positive angle while transforming into the helical angle.

5. The rotary cutting tool according to claim 1 wherein a transition between the cutting-face angle and the helix angle extends substantially parallel to the axis for a distance shorter than a diameter of the tool.

6. The cutting tool according to claim 5 wherein a transition between the cutting-face angle and the helix angle extends substantially parallel to the axis for a distance shorter than one-half a diameter of the tool.

5 7. The rotary cutting tool according to claim 1 wherein the end face and the outer periphery are joined by a chamfer, the chamfer having an axial extension shorter than an axial extension of a transition from the cutting-face angle to the helix angle.

10 8. The rotary cutting tool according to claim 1, wherein a wall of each cutting groove forms a lateral angle with a plane containing the axis and passing through the cutting edge of such cutting grooves; the cutting-face angle of such cutting groove being equal to the lateral angle.

9. The rotary cutting tool according to claim 1 comprising a drilling tool.

15 10. The rotary cutting tool according to claim 1 comprising a milling tool.

20 11. A process for the manufacture of a rotary cutting tool, the rotary cutting tool comprising a shank and a cutting part disposed at a front end of the shank and defining a first axis of rotation; the process comprising shaping a helical groove in an outer periphery of the cutting part by the steps of:

A) rotating an abrasive disc about a second axis of rotation;

B) engaging the rotating disc against the outer periphery of the cutting part at a location rearwardly of a front end face of the cutting part with the first axis inclined relative to the front axis;

C) rotating the cutting part about the first axis during step B;

D) producing relative axial movement between the disc and the cutting part in a direction parallel to the first axis during steps B and C whereby the disc approaches the front end face, along a helix angle; and

E) tilting the disc continuously when the disc reaches a position adjacent the front end face, wherein the groove forms a continuously reducing helix angle toward the front end face.

10 12. The process according to claim 11 wherein the abrasive disc forms the helical groove during steps A-E.

13. The process according to claim 11 wherein the abrasive disc finishes a preformed groove during steps A-E.

15 14. The process according to claim 11 wherein a ratio between the relative axial movement and the rotational velocity of the cutting part has a first value during steps A-D, and a second value during step E, wherein the second value is greater than the first value.